

## FAX TRANSMITTAL

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This FAX is to provide you with the "Responses to USEPA Review Comments" which were mistakenly omitted from the FED ET submittals you will receive today.

Any questions please Call.

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**RESPONSES TO USEPA REVIEW COMMENTS  
RI/FS WORK PLAN DATED FEBRUARY 28, 1994  
WEST LAKE LANDFILL, BRIDGETON, MISSOURI**

**WORK PLAN**

1. Page 1-2. Please explain why the text states, "... select a technically and economically appropriate remedial alternative". The Guidance for Conducting Remedial Investigations (RI) and Feasibility Studies (FS) Under CERCLA (EPA/540/G-89/004) states, "The RI continues to serve as the mechanism for collecting data to characterize site conditions; determine the nature of the waste; assess risk to human health and the environment; and conduct treatability testing as necessary to evaluate the potential performance and cost of the treatment technologies that are being considered. The latter also supports the design of selected remedies. The FS continues to serve as the mechanism for the development, screening, and detailed evaluation of alternative remedial actions." The text should be expanded to define the purpose in accordance with the guidance.

**Response:** The text on page 1-2 has been expanded to define the purpose in accordance with the guidance. The revised text is as follows: " ... *the Work Plan identifies the additional information and data that must be acquired to complete the RI and FS under CERCLA. The RI serves as the mechanism for collecting data to characterize site conditions; determine the nature of the waste; assess risk to human health and the environment; and conduct treatability testing as necessary to evaluate the potential performance and cost of the treatment technologies that are being considered. The RI also supports the design of selected remedies. The FS serves as the mechanism for the development, screening, and detailed evaluation of alternative remedial actions. The objective of the remedial actions is to ensure protection of human health and the environment* "

2. Figure 3-8. Explain why there is no break in bedrock contours over the quarry. We suspect that the computer generated contours may be the explanation. We suggest that the text should clearly state that the bedrock contours over the quarry are projected to illustrate the probable bedrock configuration, if quarrying had not occurred.

**Response:** The text has been revised as follows: "*The bedrock contours in the former quarry are projected to illustrate the probable bedrock surface, if quarrying within the former quarry had not occurred.*"



3. Page 3-15. The text states "Groundwater contour data show essentially the same overall pattern [groundwater trough oriented in a northwesterly direction] within all three well completion depths. There are problems with this interpretation, such as:

- apparent groundwater mound sits in the middle of the trough in Figures 3-10, 3-11, and 3-13;
- data control is insufficient to draw the NE limb in Figure 3-10, the SE extension of the 436' contour in Figure 3-11, or the open end of the 433' contour in Figure 3-13

These issues should be described in the text. The text should state that additional data is necessary to adequately describe the hydrogeology. Observe that the data collected in the August 1985 for intermediate wells is the most comprehensive of the data sets available. State that Figure 3-14 was drawn from this data set and that there is no justification for assuming that the groundwater flow patterns in the shallow and deep alluvial aquifers do not conform to the same pattern. Using this pattern, the remainder of the groundwater maps were drawn. Point out that this model was used to select tentative locations for additional observation wells.

**Response:** The text has been revised as follows: *"Review of the groundwater contour maps suggests that a groundwater trough is present beneath the Site. This trough is oriented in a northwesterly direction. Groundwater flow is generally directed towards the center of the property and exits on the north, beneath Area 2. This interpretation is based on limited data. The August 1985 Intermediate well data (Figure 3-14) represents the most comprehensive set of groundwater data available and is the basis for contouring of the groundwater in the other well completion intervals and contouring of the March 30, 1985 data. Based on the available data, there is no reason for assuming that the groundwater flow in the shallow and deeper alluvial aquifers do not conform to this general groundwater flow pattern. Additional water elevation data are necessary to confirm groundwater flow direction within each of the three depth intervals. The above interpretation provides the basis for the tentative monitoring well locations identified in Section 6.4.1 of this Work Plan."*



4. Page 3-15. The text on Page 3-15 of the work plan states, "Forty-six monitoring wells have been installed in and around the Site..." and Table 3-2 summarizes the well construction details for the monitoring wells which lists 56 wells. Please explain the discrepancy.

**Response:** The text has been revised as follows: *"Fifty-six monitoring wells have been installed in and around the Site, and 46 of these wells are reported to currently exist."*

5. Page 4-10. This paragraph states that terrestrial species' contact with contaminated soil would be limited to areas of slope failure or isolated areas of loss of soil cover integrity. This is not necessarily true. A burrowing species may contact contaminated soil present beneath the surface.

**Response:** The text has been revised as follows: *"Since site contamination has been covered with fill, terrestrial species' contact with contamination from the site would be limited to burrowing species, unless a slope failure occurs that produces a loss of soil cover. If a slope failure occurs, then this may result in exposure of potentially hazardous underlying materials. Exposure to other ecological receptors, as well as on-site workers and the general public could then occur through direct contact and airborne releases."*

6. Table 4-2. The Uranium & Decay Products contaminant migration potential for soils/sediments is described as LOW. The contaminants have already migrated to the adjacent property due to erosion. The potential would seem greater with actual migration of contamination documented. Please re-evaluate.

**Response:** A footnote has been placed on Table 4-2. This footnote is as follows: *"A soil cover has been placed over the landfill and the potential for migration of soil beneath the landfill cover is considered low. A slope failure had locally occurred near the Ford property and has been mitigated by the placement of additional soil cover. The migration potential for this localized slope debris on the Ford property is higher."*

7. Table 4-3. Please explain why the exposure routes for general public are not considered for air. RI activities that disturb the subsurface also introduce the possibility that airborne releases (of contaminated particulates) could occur. Airborne releases of contaminated particulates is also possible from waste-soil piles which are not stabilized. Also, please explain why ecological receptors are not considered to be addressed for soils/sediments and air.

**Response:** Table 4-3 has been revised to include: 1) air as an exposure route for the general public, and 2) soils/sediments and air exposure routes for ecological receptors. The text has also been changed as indicated in the response to Comment 8. Please also refer to the response to Comment 5.





8. Page 4-13. It appears the Conceptual Site Model does not take into consideration the contamination that has migrated to the adjacent Ford property. The adjacent property does not have limited access. The potential exposure would be greater to the general public than the landfill itself, the text should include a discussion related to the potential exposures associated with the adjacent Ford property.

**Response:** The text has been revised as follows: *"An exception is the slope of the landfill; slope failures can occur and can lead to exposure of potential underlying contaminants and mass transport of those materials. A slope failure had occurred on the north face of the landfill and erosional transport has locally lead to the migration of radionuclides onto the adjacent Ford property. The slope of the landfill has been mitigated with the placement of additional soil cover. The soil that has migrated onto the Ford property may have resulted in the presence of contaminants near the ground surface. Exposure to possible contaminants in this area can potentially occur through direct contact or airborne releases."*

9. Page 5-2. The RI/FS objectives should include, the data necessary to evaluate the ecological risk associated with the site.

**Response:** The text has been revised as follows: *"Collect sufficient information to support human health and ecological risk assessment."*

10. Page 5-3. The radiological survey should include the adjacent Ford property.

**Response:** The text has been revised as follows: *"... will be performed on a grid pattern throughout and surrounding Radiological Areas 1 and 2, and include a portion of the adjacent Ford property."*

11. Page 5-4. The text states that the local residential and commercial characteristics will be examined. The examination should include the population growth and decline.

**Response:** The text has been revised as follows: *"The local residential and commercial characteristics, as well as population growth and decline will be examined."*

12. Page 5-4. Please explain what action will be performed prior to drilling within the landfill material (i.e., landfill gas venting). Methane in the range of 10-50 % LEL has been reported in Area 1. The WP does not discuss how the gas conditions will be addressed during the proposed activities.

**Response:** The text has been revised as follows: *"Prior to the drilling of the soil borings a landfill gas survey will be performed. This survey will involve the collection of landfill gas samples using a probe (methane analysis only) at each of the planned boring/well locations. Landfill gas samples will also be collected at eight locations using a flux chamber placed on the ground surface. These additional samples will be analyzed for volatile contaminants of concern. The eight locations correspond to planned random surface soil sample locations."*



13. Page 5-5. Please explain how the LEL meter will provide sufficient data to be used for determining risk associated with the air exposure pathway. Data currently exists which documents the methane levels range in Area 1 from 10% to 50% LEL.

**Response:** The text has been revised as follows: *"As part of efforts to characterize the nature and extent of non-radioactive contamination in Areas 1 and 2, a landfill gas sample will be collected at each planned boring and well location using a probe (methane analyses only). Eight additional air samples will be collected from the surface of the landfill using a flux chamber. These additional samples will be analyzed for volatile organic chemicals of concern."*

14. Page 5-5. This paragraph states that two potential air contaminant concerns have been identified at the site - radon gas and landfill gas. There is a third potential concern - entrainment of contaminants in fugitive dust.

**Response:** The text has been revised to include fugitive dust as an airborne concern. The text has been revised as follows: *The third airborne concern is entrainment of contaminants in fugitive dust. Sampling of fugitive dust from non-vegetated areas and roadways will be performed in conjunction with the landfill gas sampling program."*

15. Page 5-6 The objective of remedial action is not to maintain the risk to human health and the environment, from conditions at the Site, to an acceptable level. The objective of remedial action should be to ensure the protection of human health and the environment.

**Response:** The text has been revised as follows: *".... the objective of remedial action is to ensure the protection of human health and the environment."*

16. Table 5-1 Groundwater can only be contaminated or unaffected depending on whether or not releases to the groundwater have exceeded a predetermined concentration. Remedial Objectives (ROs) for contaminated groundwater could include capture/recovery, corrective action, (i.e., reduction of observed concentrations), or control of contaminant migration. ROs for unaffected groundwater could include isolation from contaminated sources. Similarly, ROs for contaminated air would include actions to mitigate the spread of contaminants already in the airstream.

**Response:** The Preliminary Remedial Actions for groundwater and air have been revised as follows: [Groundwater] *Contain or control offsite migration of contaminants in groundwater that are at concentrations in excess of ARARs or that pose unacceptable risk (e.g. capture, isolation, etc.)* [Air] *Prevent/mitigate the release of contaminants to the air in concentrations that would exceed ARARs or pose unacceptable risk.*



17. Page 5-8. The text states that the most-probable future land use is commercial/industrial. The text should be expanded to include that the property is currently zoned residential.

**Response:** The text has been revised as follows: *"It is noted that a portion of Area 2 is currently zoned residential; however, a prior judicial determination (Westlake Quarry and Material Company vs. City of Bridgeton, Case 761 S.W.2D 749,753 [MoAP 1988]), directed at the property directly south of the Westlake Landfill (toward the referenced residential area) found that the residential zoning was unconstitutional, unreasonable, and arbitrary. The court held that "[t]he evidence regarding the adaptability of the property for development under its current [residential] zoning showed that residential development, although theoretically possible, is not economically feasible." In evaluating a reasonable maximum exposure scenario, the Preamble to the 1990 NCP states that "... only potential exposures that are likely to occur will be included in the assessment of exposures."*

18. Table 5-3 The table should include risk assessment under the column "Data Uses" and under the column "Analytic Level" should state Level III for the landfill gas Work Plan activity. The risk associated with the landfill gas should be evaluated as a part of the activities planned at West Lake Landfill.

**Response:** Table 5-3 has been revised under *Landfill Gas* to include *Risk Assessment*. The *Analytic Level* for the *Risk Assessment* is Level III.

19. Table 5-4 The Data Quality Objectives table indicates the unit for water as pCi/l and soil as pCi/g. The chemicals listed in Table 5-4 are not radiological. The table needs to be corrected.

**Response:** Table 5-4 has been corrected. The correct soil units are mg/kg; the correct water units are ug/l.



20. Table 5-4 Reporting limits for several contaminants in tap water and soil are above the calculated PRG. Text on page 5-14 indicates reporting limits were developed considering background levels are provided in only a few cases for contaminants of concern whose reporting limits exceed the PRG. Please provide a rationale for reporting limits exceeding PRGs.

**Response:** No changes in text were made in response to this comment.

The laboratory method reporting limit is the detection limit specified on this table. Most laboratory analytical equipment in use today can detect compounds at concentrations below the method reporting limit, unless sample dilution was required. During the analysis of the samples, the analyzing laboratory will be requested to quantify all compounds that are detected below the method reporting limit.

Additional search on published background concentrations will be performed as part of the RI/FS. If background levels can be established, especially for the radionuclides in groundwater, then we may be able to establish PRGs that are higher, and within the limits of quantification for the analyzing laboratory.

21. Page 6-1. The Latty Avenue site cannot be identified as a background sampling site. The borrow area as a background sampling site is not a good background location due to the different timeframes involved from the various borrow areas. It would provide questionable data which result in uncertainty and may be difficult to interpret the results.

**Response:** The text has been revised to indicate that background sampling at the Latty Avenue site and borrow areas may be considered for background reference. In establishing background, we will approach the assessment with an open-mind and consider other ideas that may be posed by the USEPA or it's contractors.

22. Table 6-1 (p. 3 of 3). Air sampling for contaminants (including radionuclides) in fugitive dust should be added under the Action column for Air/Landfill Gas.

**Response:** The table has been expanded to include fugitive dust sampling for site characterization and risk assessment purposes. Fugitive dust samples will be analyzed for radionuclides and priority pollutant chemicals of concern.

23. Page 6-8. Paragraph 2 states that the ion chamber instruments must be left in place 20-60 minutes before stable readings can be obtained. This is incorrect. Portable, hand held chambers typically can provide indication of radiation levels in 20-40 seconds and will stabilize in as little as 3 to 5 minutes.

**Response:** The text is incorrect and has been revised accordingly





24. Page 6-6. The text states, "Pursuant to the USEPA request in a letter dated February 10, 1994, selected samples will be analyzed for uranium-234, thorium-232, protactinium-231, actinium-221, and lead-210." EPA's letter was dated February 18, 1994 and stated that thorium-232 was found at the St. Louis Airport Sites and that it should be investigated at West Lake. The other compounds (i.e., uranium-234, protactinium-231...) listed were already in the work plan to be investigated.

**Response:** The text has been revised as follows: *"Pursuant to the USEPA request in a letter dated February 18, 1994, selected samples will be analyzed for thorium-232"*

25. Page 6-6. The planned field activities should include air monitoring.

**Response:** The text has been revised as follows: *"Air monitoring will be performed during several of the above tasks for health and safety purposes. Air monitoring for potential fugitive dust transport, and evaluation of potential volatile chemical release at the landfill surface will be performed as part of the planned landfill gas sampling and analysis task."*

26. Page 6-7 The text states, "If erosional sediments have flowed onto the adjacent Ford property, then these deposits will be mapped." As the Dames and Moore Reports (Phase II and III) for the Ford property documents that erosional sediments have migrated from the West Lake Landfill. There should be no reason to consider the investigation of the Ford property at a later date. There is no security to prevent the public from having access to this property and it has been determined that radiological contamination exists at the surface. Evaluating the adjacent property should be done during this investigation. In addition to the investigation the need for immediate action (i.e., removal action) to eliminate the potential for exposure should be considered.

**Response:** The text has been revised as follows: *"Erosional sediments have flowed onto the adjacent Ford property; these deposits along with any other identified areas where erosional sediments have flowed onto the adjacent properties will be mapped. Interim measures, such as placement of fencing around any identified areas to limit public access, will be proposed to the USEPA after the areas are identified, mapped, and more clearly delineated based on the planned overland gamma survey."*



- 27 Page 6-8 The response to our previous comment 68 addressed our concerns. However, the text in the work plan did not incorporate the response. The response should be included in the text. We suggest that the response be added to Section 6.2 of the work plan and also the portion of the response which relates to the sampling procedures should be incorporated into the SAP.

**Response:** The following additional text has been added to Section 6.2 and the SAP: *"Radiological 'hot spots' are defined as areas exhibiting gamma-ray exposure rates that are a factor of two higher than the exposure rates encountered in radiologically uncontaminated areas with otherwise similar soil characteristics. Background exposure rates are the basis of comparison for defining hot spots and are expected to fall in the range of 6 to 10 uR/hr. The average background radiation exposure rate reported by the National Council for Radiation Protection for middle America is 7 uR/hr (NCRP, Report No. 94, 1987). Local background will be established by taking a measurement off-site on the open field east of the site and east of the St. Charles Rock Road entrance to the site.*

*It is recognized that, as a landfill, the site likely has received soils from a variety of sources and, as a result, definition of a representative background sampling location is difficult. In order to establish a representative site-specific reference background measurement, an attempt will be made to identify an off-site, background reference sampling location that has surface soils that are similar to the majority of the soils found on the Site. If sources of the soil fill can be clearly established such as any borrow areas on-site or specific uncontaminated areas of the Larry Avenue site, these sites may be proposed by the Respondents as additional reference background sampling sites for USEPA approval.*

*In evaluating site measurements against background measurements and identifying "hot spots", consideration will be given to any apparent differences in soil type at the various on-site measurement locations, and the typical range of gamma-ray exposure rate values reported for regional soils. With the preceding caveat in mind, those locations indicated in the overland radiological survey as having maximum exposure rates greater than twice background, will be designated as "hot spots". In the event that there are; an excessive number of "hot spots" identified under this criteria, or the indicated locations are not sufficiently distributed across the Site, or no "hot spots" are identified, then recommended alternate locations for borings will be submitted by the Respondent Group to USEPA for review and approval."*



28. Page 6-16. The work plan does not discuss the previous investigations regarding the methane concentrations at the site. The Environmental Investigation and Health Impact Assessment Bridgeton Sanitary Landfill prepared by Laidlaw Waste Systems provides data which indicates methane levels in the range of 10-50 % LEL for methane. The data should be reviewed and considered prior to any drilling within the landfill. All regulations should be consulted prior to drilling and discussed as a part of this work plan. The GasTech combustible gas indicator will not provide sufficient data necessary to evaluate the risks associated with the air pathway for the baseline risk assessment. The elevated methane concentrations at the site have proven the need to include a landfill gas investigation in the work plan rather than be considered as a contingency.

**Response:** The text has been revised at three locations to address this comment. The first change is in Section 6.3.2. The title of this section has been changed to *Surface Geophysical Survey and Preliminary Landfill Gas Evaluation*. The following text has been added to this section, *"After completion of the geophysical survey and utility clearance, a landfill gas sample will be collected at one or more depths at each boring location using a probe; this sample will be analyzed for methane concentration. The results of these analyses, together with previous landfill gas data collected by Laidlaw at the adjacent Bridgeton Sanitary Landfill, will be used to define appropriate health and safety procedures for the drilling program. The results of these analyses may also impact planned boring locations and precautionary measures to be implemented during the drilling. All planned soil borings and wells will be drilled and abandoned in accordance with applicable Missouri regulations.*

The text in Section 6.3.3 has also been changed. The last paragraph in this section, referencing the contingency landfill gas investigation, has been eliminated.

Landfill gas sampling and analyses are discussed further as a new section in the Work Plan (Section 6.11 Landfill Gas Sampling)



29. Page 6-16. The response to EPA's previous comment no. 71 includes a procedure which states, "At the bore hole location, insert a hollow steel tube of sufficient length to reach the bottom of the bore hole". However, the work plan and SAP is not consistent and state that a PVC tube will be used. PVC tube is acceptable, however the discrepancy needs to be clarified.

We suggest that the tube be passed into the bore hole along the sidewall rather than in the center. The sidewall readings could eliminate problems due to counting geometry and access in large diameter borings. Readings taken from the sidewall are likely to be very reproducible. A method similar to water-level measurements, i.e., all readings will be taken through a tube lowered into the borehole against the northern-most sidewall etc. should be provided. The method would allow the logging position to be "re-occupied" and measured for QA/QC evaluation. In addition, sidewall readings would eliminate distance/shielding inconsistencies between small and large diameter boreholes. If the detector is equipped with a collimeter, you can assure that photons detected by the instrument originate from the nearest boring wall.

Consideration should be given to using a 3/8" X 3/8" NaI(Tl) detector with a portable multi-channel analyzer (MCA) instead of the SCA. Limited isotope identification may be more useful than a gross gamma count,

**Response:** The text has been revised as follows: *"Logging will be performed using a 3/8"x3/8" sodium iodide (NaI) detector with a portable single channel analyzer (SCA) or multi-channel analyzer (MCA). The detector will be equipped with a collimeter to ensure that the photons detected originate from the nearest boring wall."* Testing will be performed through 2-inch diameter PVC casing as indicated in the Work Plan and the SAP. As suggested the casing will be placed along the north wall of each boring.

30. Page 6-17 This paragraph states that the detector is calibrated semi-annually with a Cs-137 source to verify the relationship between cpm and exposure rate of about 30 cpm/uR/hour. It should be noted that this relationship only holds true for Cs-137.

**Response:** We are aware that this relationship holds true for Cs-137 only. Since this is a comment for informational purposes, no changes in the text have been made.

31. Page 6-18 The standard operating procedures for the selected laboratory(s) must be submitted for EPA review and approval prior to initiating any fieldwork.

**Response:** The standard operating procedures for the selected laboratories are being forwarded under separate cover for review and approval. The text has been revised to include " . . . for review and approval . . . ."





32. Page 6-20 This paragraph states that some monitoring well locations may change based on the overland gamma surveys. Please explain.

**Response:** No changes in the introductory paragraph of Section 6.4.1 have been made. The following is an explanation in response to this comment.

The overland gamma survey, together with historical data and soil analytical data from the soil borings, will be used to delineate the areal extent of Areas 1 and 2. Since the monitoring wells are scheduled to be placed outward from the perimeter of these two areas, the planned well locations may change based on the areal extent of these two areas. If the areal extent of Areas 1 and 2 is larger than currently believed, then the wells will be moved radially outward. If the areal extent is smaller, then the wells will be moved inward. Placement of monitoring wells as indicated in the text will also be dependent on groundwater flow direction. The proposed well placement is based on the limited data available at this time. Additional data will be collected on a monthly basis prior to the drilling of the wells to optimize well placement.

33. Page 6-28 The text states that development will continue until the physical parameters have stabilized and the water is non-turbid (<100 NTU). The turbidity should be less than 30 NTU unless determined in the field and agreed to by EPA that this level is not achievable.

**Response:** The text has been revised as follows: *"Development will continue until these physical parameters have stabilized and the water is non-turbid (<30 Nephelometric Turbidity Units [NTUs], unless this turbidity level is not achievable, based on field measurements, and an agreed change is approved by the USEPA).*

34. Page 6-30 The text states that priority pollutant metals and radionuclide analyses will be performed on both filtered and unfiltered samples during the initial sampling round, and only on filtered samples during the second round. The analytical results for all samples should at least have total analyses. If filtered samples are to be obtained then they may be performed in addition to the total analyses. The data to be used for risk assessment will be total analyses only.

**Response:** The text has been revised as follows: *"Priority pollutant metals and radionuclide analyses will be performed on both filtered and unfiltered samples during the initial sampling round, and unfiltered samples during the second sampling round. Filtered analyses may also be performed on selected wells for selected metals during the second sampling round.*



35. Page 6-32 Please clarify if surface water/leachate/rainwater run-off samples will be filtered or unfiltered for analysis. We recommend unfiltered analyses.

**Response:** Surface water samples will be analyzed as both unfiltered and filtered samples. Leachate samples will be analyzed as both unfiltered and filtered samples, if possible. If an insufficient quantity of liquid is available, then the samples will be unfiltered. The rainwater run-off will be analyzed for radionuclide metals as both unfiltered and filtered samples. Priority pollutant metals will not be run on the water samples, since sediment samples will be collected at the rainwater run-off sample locations.

The text in Sections 6.6 (leachate sampling) and 6.7 (rainwater run-off) has been changed as follows: "*Metal analyses will be performed on unfiltered samples, and also filtered samples if a sufficient quantity of liquid is obtained*" [Section 6.6]. "*Radionuclide metal analyses will be performed on both unfiltered and filtered samples*" [Section 6.7].

No changes in text are required in Section 6.8 (surface water), as the text as previously submitted states, "*Priority pollutant metal and radionuclide analyses will be performed on both filtered and unfiltered samples*".

36. Figure 6-6 The surface water sampling locations do not fully characterize the potential impact from the site. One sampling location is not sufficient to characterize the northwest face of Area 2. Please rationalize why no samples are necessary north of Area 1 prior to entering surface water at Area 2. Please re-evaluate surface water sampling.

**Response:** No changes in the text have been made to address this comment. Figure 6-6 identifies rainwater runoff and erosional sediment sampling locations and it is assumed that this comment refers to rainwater sampling locations and not surface water sampling locations. Irregardless, as indicated below and as stated in the text, all planned sampling locations (surface water and rainwater) will be re-confirmed during the site reconnaissance and all planned sampling locations will be submitted to the USEPA for approval prior to the collection of samples. A response to this comment is provided below.

The selected rainwater sampling locations are based on drainage patterns as indicated by the 1992 topographic map of the site and surrounding area. A topographic survey has been performed earlier this year (1994). The new survey, together with the planned site reconnaissance will provide the basis for actual sampling locations. As stated in the Work Plan, "*[a]ll sampling locations will be confirmed with the USEPA prior to the collection of samples*". The concern regarding the need to collect an additional run-off sample north of Area 1, prior to entering surface water at Area 2, will be evaluated and addressed as part of the planned scope of work.



37. Page 6-34 Please provide the rationale for not analyzing priority pollutant metals in rainwater runoff samples.

**Response:** Rainwater run-off samples are not scheduled to be analyzed for priority pollutant metals because sediment samples are to be collected at the same location, and the sediment samples will provide a better indication of whether or not metals are being transported offsite by rainwater run-off. The rationale for not sampling rainwater run-off for priority pollutant metals was discussed, and agreed to, during a telephone call with the USEPA at the time the Work Plan was being revised in February 1994.

The text has been revised as follows to address this comment, *"Priority pollutant metal analyses are not being performed on rainwater runoff samples because erosional sediments are to be collected at the same location, and the sediment samples will provide a better indication of whether or not metals are being transported offsite by rainwater run-off."*

38. Page 6-34 The text should reference Figure 6-3 where staff gage/surface water sampling locations are initially shown.

**Response:** The text has been revised to include reference to this figure.

39. Page 7-28 This table shows cobalt as having an MCL of 5 ug/L. What is the source of this MCL?

**Response:** The table is incorrect and has been corrected. There is no MCL for cobalt.

40. Page 7-39 This paragraph states that non-promulgated criteria, advisories or guidance issued by Federal or State agencies may be considered as To Be Considered (TBCs) in determining clean up levels for the protection of public health or the environment. The State of Missouri has proposed Any-Use Soil Levels (ASLs) documenting maximum soil concentrations which are acceptable to human health in a residential setting. While the proposal was withdrawn in November of 1992, the state plans on re-proposing these ASLs in the near future; therefore Missouri's ASLs should be retained as TBCs.

**Response:** As discussed during our comment review meeting on July 13, the State of Missouri ASLs will not be included in the Work Plan as a TBC. While we understand that the State of Missouri may re-issue the ASLs at a later date, we do not know when this may occur, nor the substance of the revised ASLs. Additionally, the ASLs are applicable only to a residential scenario, and as discussed earlier, we do not believe that residential development is a likely and appropriate exposure scenario for evaluating the potential health risks associated with Areas 1 and 2.



41. Page 7-52 The preliminary list of remedial alternatives provided in the text is too limited. Please refer to EPA's guidance "Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites". The text should be expanded to include other remedial alternatives.

**Response:** The preliminary list has been expanded to include *Access Restriction* and *Surface Capping*. Table 7-5 of the Work Plan presents a more complete list of possible response actions and remedial technologies.

## Appendix A Sampling and Analysis Plan

42. Page 1-1 Please refer to comment 15.

**Response:** The text has been revised as follows: *"The Work Plan identifies the additional information and data that must be acquired to complete the RI and FS under CERCLA. The RI serves as the mechanism for collecting data to characterize site conditions; determine the nature of the waste; assess risk to human health and the environment; and conduct treatability testing as necessary to evaluate the potential performance and cost of the treatment technologies that are being considered. The RI also supports the design of selected remedies. The FS serves as the mechanism for the development, screening, and detailed evaluation of alternative remedial actions. The objective of the remedial actions is to ensure protection of human health and the environment".*

43. Page 1-4 The environmental media which will be evaluated should not consider landfill gas as a contingency. The landfill gas has been evaluated in the EI and HI Assessment performed by Laidlaw which indicates elevated levels of methane. The Work Plan and Sampling and Analysis Plan should provide the procedures that will be utilized for evaluating the landfill gas as well as drilling in the landfill with high levels of methane. The data to be obtained for evaluating the landfill gas should be of quality (i.e. Level III) to be used in the baseline risk assessment. The EI and HI Assessment report indicates elevated levels of Ra-222 within the landfill gas. The landfill gas should be fully characterized for all COPCs to determine the risk associated with the air pathway.

**Response:** In the list of environmental media to be evaluated, the word contingency has been removed from *Landfill Gas*. The text in the paragraph that follows the list has been revised as follows: *"The presence and type of landfill gasses that may be present will be evaluated by collection of soil vapor samples at each of the planned soil boring and well locations, and also by collection of air samples from the surface of the landfill using a flux chamber. The soil vapor samples will be analyzed for methane only; the surface air samples will be analyzed for volatile chemicals of concern. During the field investigation, landfill gasses will be additionally monitored for health and safety purposes.*





44. Page 3-11 Duplicate samples to be collected should be at least 10% of the total number of samples to be analyzed.

**Response:** The text has been revised as follows: *"Duplicate soil samples will be collected from 10% of the total number of samples scheduled to be analyzed".*

45. Page 3-13, Please clarify how the data of the overland radiological survey will form the basis for selecting boring locations (i.e. Will borings be collected at the 5 "hottest" locations irregardless of the areal extent of "hot" readings? Will the borings be completed at locations centered within the 5 largest zones of "hot" readings?)

**Response:** The following text has been added as a clarification: *"When identifying 'hot-spot' sample locations, consideration will be given to both the numerical value of the reading, the areal extent over which the 'hot-spot' was identified, and the geographic distribution of 'hot-spots' over the Site. The USEPA will be consulted during the assessment of 'hot-spot' sampling locations".*

46. Page 3-16 Additional information should be provided as to how all the soil piles will be managed (i.e. pile stabilization, dust releases, etc).

**Response:** The following text has been added: *"The soil piles will be inspected on a routine monthly basis to ensure that they are properly covered and not a potential source of fugitive dust. After the field investigation is complete and the character of the soil piles is known, then recommendations for long-term management of the soil piles will be provided".*

47. Page 3-18 Radiological contamination has been detected in well south of Areas 1 and 2. Specific instances where radiological detections have been identified are from 1990-1991 water samples collected from monitoring wells D-89, S-75, MW-F2 and in 1986 water samples from D-81, S-54, I-56, and S-88. Please explain the rationale for not including these wells into the sampling program. Previous data should be considered.

**Response:** No revisions in the text have been made.

The wells selected for inclusion in the sampling program were selected based on their proximity to Areas 1 and 2. Because of well construction concerns and the lack of adequate documentation (well design and construction, well development, and purging prior to sample collection), all previously collected water analytical data were considered as suspect. Our approach is to re-develop all existing useable wells. Water from each of the wells to be developed will be analyzed for gross alpha. The gross alpha will provide a basis for segregation and disposal of the development water, and potentially can be used for inclusion of additional wells in the sampling program. Recommendations for inclusion of additional wells in the sampling program will be provided to the USEPA after re-development of the existing wells has been completed.



48. Page 3-29 A dedicated bailer for each well should be used for sampling or purging.

**Response:** No revisions in the text have been made. The text states *"Groundwater samples will be collected using either stainless steel or a disposable polyethylene bailers"* (page 3-28). Our experience is that it is more cost effective to use a disposable bailer, then a dedicated bailer. Also, using a disposable bailer with new rope for each well during each sampling round eliminates the concern that airborne contaminants may adhere on the rope between sampling rounds and result in the false presence of a contaminant.

49. Page 3-29 Duplicate samples to be collected should be at least 10% of the total number of wells sampled.

**Response:** The text has been revised to indicate that duplicates will be collected from 10% of the total number of wells sampled.

50. Page 3-30 Refer to comment 21.

**Response:** The reference should be comment 31. The standard operating procedures for the selected laboratories are being forwarded under separate cover. The text has been revised to include *".... for review and approval ..."*.

The initial paragraph under the heading *Laboratory Analyses* has been revised per previous comment 34 as follows: *"Priority pollutant metals and radionuclide analyses will be performed on both filtered and unfiltered samples during the initial sampling round, and unfiltered samples during the second sampling round. Filtered analyses may also be performed on selected wells for selected metals during the second sampling round."*

51. Page 3-32 When obtaining surface soils to be sampled for VOCs, the sampling depth should be 18"-24".

**Response:** The text has been revised as follows: *"Samples for analysis of VOCs will be performed at a depth of 18 inches to 24 inches. The planned air sampling of the landfill surface for volatile chemicals of concern using a flux chamber may eliminate the need to collect soil samples for VOC analysis. The decision to sample both the soil and surface of the landfill for VOCs will be based on consultation with the USEPA and the Missouri Department of Health (risk assessment contractor)."*



## QUALITY ASSURANCE PROJECT PLAN

52. Page 3-3 This paragraph states that surface water sampling will be performed at the North Water Body, adjacent to Area 2 Section 6.8, page 6-34, third paragraph of the work plan states that surface water sampling will be performed at other low-lying water drainage retention ponds as well. Please clarify the discrepancy.

**Response:** The text has been revised to be consistent with Section 6.8 of the Work Plan. Surface water samples as indicated in the this section *"..... will be collected from the surface water body located immediately north of Area 2, and any other low-lying water drainage retention area receiving rainwater run-off from Areas 1 and 2, or any leachate from these areas."*

## SITE SAFETY AND HEALTH PLAN

53. Table 3-3 It should be noted that the Permissible Exposure Limit (PEL) of 1.25 rem/quarter for radioactive material only applies to individuals who have received radiological training to minimize their exposure and includes both external and internal exposures.

**Response:** We are aware and acknowledge this training requirement. No revisions to the text have been made.



**RESPONSES TO MDNR REVIEW COMMENTS  
RI/FS WORK PLAN DATED FEBRUARY 28, 1994  
WEST LAKE LANDFILL, BRIDGETON, MISSOURI**

1. We have a serious concern over the suitability of the existing wells chosen for water quality sampling. At least one of the chosen wells, and perhaps others, was constructed in a manner which renders it inappropriate for the planned water quality monitoring. The plan does not provide a rationale for the wells chosen.

**Response:** No change in text has been made to address this comment. The following is a response to the comment.

The existing wells selected for sampling were selected based on their proximity to radiological Areas 1 and 2. The suitability of the existing wells for water quality sampling will be determined as one of the initial tasks to be performed. This determination will include: visual evaluation of the physical external condition of the wells; sounding of the bottom of each well; re-development of each well; and a review of available drilling logs and well construction details. If a well is damaged at the surface, then recommendations for repair, or abandonment of the well will be provided. If well development does not result in a turbidity level that is acceptable to the USEPA, or if the manner in which the well was constructed may compromise the analytical data to be obtained (based on review of the drilling logs and well construction details), then the identified wells will be used for hydrologic purposes only, and not included in the sampling program.

2. Page 3-4, last paragraph: Cambrian should replace Ordovician in the last sentence.

**Response:** The text has been corrected.

3. Page 3-16, Table 3-2: This table presents some interesting information; in instance, several wells are listed as being completed deeper than the total depth of the borehole they are in. Despite this, the table is very helpful in providing information about the existing wells, particularly the cross reference between the original and current well numbers. However, it does not satisfy the requirement, as stated in the State of Work, of a "critique of all well construction data..." which I consider important when choosing existing wells to use for sampling.

**Response:** The table has been corrected. Please refer to the response to Comment 1 above for a discussion on a critique of well construction data.

4. Page 5-15, Table 5-4: The units used on the first page of this table are incorrect. Soil units should be ug/kg, and the water units should be ug/l. The units on the second page of this table (i.e. for radionuclides) are correct.

**Response:** The non-radiological units in the this have been corrected; soil units are expressed in mg/kg, and water units are in ug/l.





5. Page 6-19, Section 6.3.7: All borings planned at the site, if greater than 10 feet deep, are by definition (RSMo 256.603) monitoring wells. Those abandoned must be plugged according to state regulations as set forth in 10 CSR 23-4.080. Backfilling with soil is not permitted, they must be grouted from the bottom to two feet below the surface.

**Response:** All soil borings will be backfilled with a cement slurry using a tremie placed at the bottom of the boring. Reference in the text to backfilling the boring with soil has been eliminated.

6. Page 6-21, Section 6.4.2: As mentioned above, backfilling pre-drilled borings at monitoring well locations with soil is not permitted by state regulations.

**Response:** See Comment 5 above. All soil borings will be backfilled with a cement slurry using a tremie placed at the bottom of the boring. Reference to backfilling the boring with soil has been eliminated.

7. Page 6-30, Section 6.4.6: This section lists which existing wells are to be used for water quality sampling. It is not clear whether well construction technique was evaluated when choosing these wells. Well construction is in important consideration. The drilling log for Well D-92 indicates that a bentonite based drilling mud was used to drill the borehole for the well and some of the bentonite mud was left in the hole as the well was constructed. The bentonite left behind may be influencing the water quality of samples from that well. The other D-series wells proposed for sampling were constructed during the same phase of investigation, by the same drilling contractor, and presumably by the same technique. I do not consider D-92 to be a well that will yield representative samples of groundwater and there is significant uncertainty with the other D-series wells.

**Response:** No change in text has been made. Please see response to Comment 1 above.

8. Appendix A. Sampling and Analysis Plan: There are two sections number 3.4.8. Also, section 3.4.10 should include decontamination procedures for aquifer testing equipment.

**Response:** The section numbering has been corrected. Reference to decontamination of aquifer testing equipment has been made.



9. Pages 5-15 and 5-16, Table 5-4: Some of the reporting limits in water for specific contaminants are above the PRG for that same contaminant in water. We would like to see documentation of the reasoning behind these reporting limits.

**Response:** This comment is similar to USEPA Comment 20. The laboratory method reporting limit is the detection limit specified on this table. Most laboratory analytical equipment in use today can detect compounds at concentrations below the method reporting limit, unless sample dilution was required. During the analysis of the samples, the analyzing laboratory will be requested to quantify all compounds that are detected below the method reporting limit.

Additional search on published background concentrations will be performed as part of the RI/FS. If background levels can be established, especially for the radionuclides in groundwater, then we may be able to establish PRGs that are higher, and within the limits of quantification for the analyzing laboratory.

10. Table 7-3A: This table lists cobalt as having a maximum contaminant level of 5 ug/l. What source does this reference? We could not confirm this value with any of the resources available to us.

**Response:** The table is incorrect and has been corrected; there is no established MCL for cobalt.

11. Page 7-39, Section 7.2.4: We have commented before that Missouri's proposed Any-Use Soils Levels rule should be included as a TBC. The response indicated that since the proposed rule had been withdrawn, it should not be a TBC. We do plan on reproposing the rule in the future; therefore, we still contend that it should be considered as a TBC.

**Response:** This comment is similar to USEPA Comment 40. As discussed during our comment review meeting on July 13, the State of Missouri ASLs will not be included in the Work Plan as a TBC. While we understand that the State of Missouri may re-issue the ASLs at a later date, we do not know when this may occur, nor the substance of the revised ASLs. Additionally, the ASLs are applicable only to a residential scenario, and as discussed earlier, we do not believe that residential development is a likely and appropriate exposure scenario for evaluating the potential health risks associated with Areas 1 and 2.

12. Page 7-52, last paragraph, first sentence: The word "be" should be deleted from the sentence.

**Response:** The text has been corrected as indicated.

13. Page 9-1, first paragraph, fifth sentence: The word "as" in this sentence should be "at."

**Response:** The text has been corrected as indicated.



#### FIELD SAMPLING PLAN

14. Page 3-29, second bullet, last sentence: The word "fives" should be "five."

**Response:** The text has been corrected as indicated.

15. Page 4-5, last bullet: The word "be" should be inserted between "will" and "utilized."

**Response:** The text has been corrected as indicated.

#### QUALITY ASSURANCE PROJECT PLAN

16. Page 7-2, last paragraph, first sentence: The word "of" should be inserted between "consist" and "a."

**Response:** The text has been corrected as indicated.





